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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/689,114	10/12/2000	Hideo Shibahara	NEKW 17.876	6403

7590 09/08/2003

Katten Muchin Zavis Rosenman  
575 Madison Avenue  
New York, NY 10022

EXAMINER

AKKAPEDDI, PRASAD R

ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 09/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	09/689,114	SHIBAHARA, HIDEO	
Examiner	Art Unit		
Prasad R Akkapeddi	2871		

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM

#### THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 04 June 2003.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-18 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-18 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 12 October 2000 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

- Certified copies of the priority documents have been received.
- Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
- Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

#### Attachment(s)

1) Notice of References Cited (PTO-892) 4) Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.

2) Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) Notice of Informal Patent Application (PTO-152)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3,4. 6) Other: \_\_\_\_\_.

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's arguments, see Amendment, filed 06/04/2003, with respect to the rejection(s) of claim(s) 1-18 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Kishimoto et al. (U.S. Patent No. 6,281,960).

### *Specification*

2. The amendment filed 06/04/2003 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: The original disclosure, on page 17, lines 2 and 3 contains a mathematical equation that contains multiplication factors for the parameters (H, B, E, F, G), as follows:

$$\begin{aligned} D1 &= (A+B+2C+D+E+F+G) \cdot H \cdot B \cdot E \cdot F \cdot G \text{ and} \\ &= A+D+2C \cdot H \end{aligned}$$

In the amendment filed on 06/04/2003, page 2, lines 3 and 4 the above equation was changed to an equation that contains subtraction for the parameters (H,B,E,F,G), as follows:

$$\begin{aligned} D1 &= (A+B+2C+D+E+F+G) - H - B - E - F - G \text{ and} \\ &= A+D+2C-H \end{aligned}$$

Hence the change between multiplication and subtraction is considered as new matter. Applicant is required to cancel the new matter in the reply to this Office Action.

3. When the Examiner tried to obtain the diameter D1 of the spherical spacers (22) using the theoretical equation given in the amendment dated 06/04/2003 from the relevant parameters given in Fig. 12 of the instant application, the Examiner failed to see the connection between the equation and the figure and failed to obtain the diameter D1 as equal to (A+D+2C-H). It is not quite obvious how the diameter is related to the given parameters. No further explanation is provided in the specification as to how the parameters A, B, C, D, E, F, G are relevant to the diameter of the spacers. Applicant is encouraged to provide an explanation.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishimoto et al. (Kishimoto) (U.S. Patent No. 6,281,960).

As to claims 1,2 and 15: Kishimoto discloses a liquid crystal display panel (100) and a process for fabricating such panel, comprising a pair of substrate structures (20, 40) having plural pixels (22) where an image is produced, liquid crystal (54) filling a gap between the substrate structures of the pair and selectively making the pixels dark and bright for producing the image, and column spacers (108) formed on one of the substrate structures (40) and held in

contact with the other of the substrate structures (20), (Figs. 1-7). Kishimoto in (col. 11, lines 23-26) discloses that the pixel size is about 320 X 320 micrometers and the size of the column spacers (108) is about 20 X 30 micrometers (Fig. 7). Hence the ratio of the total contact area between the column spacers and the other of the substrate structures to the total area occupied by the plural pixels being 0.5 % as disclosed by Kishimoto. Kishimoto also discloses a process of fabricating such panel (col. 13 and 14), as recited in claim 15 and the column spacers are respectively associated with the pixels (Fig. 7), as recited in claim 2.

Note that the range for the contact area as disclosed by Kishimoto is larger than the range of about 0.05 % to 0.015 % (asserted in claims 1 and 15). However, the recited range in the instant claim 1 is considered to be within the optimization range. Therefore, the range in claims 1 and 15 would have at least been obvious. See In re Malagari, 499 F.2d 197, 182 USPQ 549 (CCPA 1974).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the Kishimoto LCD device with a ratio as recited in order to enhance the display area by reducing either the number of spacers or by reducing the contact ratio of the spacers to enhance the viewing angle as well as having excellent display quality (col. 5, lines 61-65).

6. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishimoto in view of Murouchi (U.S. Patent No. 6,067,144).

Kishimoto discloses that each of the column spacers (108) is associated with pixels selected from plural pixels (22). However, Kishimoto does not disclose that the column spacers are classified into two groups one of which is taller than the other.

Murouchi on the other hand, in disclosing LCD cell discloses two supporting members (4 and 5) having column shapes with different heights one being taller than the other (Fig. 3).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the Kishimoto LCD panel with that of Murouchi having column spacers with two different heights in order to reduce the problems due to the width changes identified in the prior art discussion (col. 1, lines 11-67) and provides a rigid liquid crystal display cell with superior productivity and durability (col. 2, lines 13-15).

7. Claims 3-5,12,14 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishimoto and Murouchi as applied to claims 1 and 10 above, and further in view of Mashiko et al. (Mashiko) (U.S. Patent No. 6,288,766).

Kishimoto discloses additional column spacers (108) formed outside said plural pixels. Murouchi also discloses a sealing layer formed between the pixels and a peripheral area (Col. 5, line 7).

Although Kishimoto discloses a process of fabricating the panel, Kishimoto does not disclose a reservoir, a pressure adjusting means nor evacuation of the liquid crystal.

However, Mashiko in disclosing a liquid crystal display device discloses a method of manufacture and a method for injecting the liquid crystal material, pressure adjusting means (Col. 10, line 19) and the alignment and sealing of the two substrates. Mashiko also discloses a reservoir (62) (Col. 1, lines 26-38) and the pressure being from vacuum to .01 and 1-50 torr (Col. 11, lines 57-60) that is less than the atmospheric pressure as recited in claim 14. When 1 atmospheric pressure being equal to 110,000 N/m<sup>2</sup> and also equals to approximately 760 torr (the applicant is requested to refer to any text book in Physics for these conversion factors), it would have been obvious to one having an ordinary skill in the art to convert the above units to come up with the recited features of 0/01 N/m<sup>2</sup> to 6KN/m<sup>2</sup> as recited in claims 16 and 17. Since the cell is still being assembled when the pressure is being applied, there is no electrical power and the room temperature operation is disclosed in abstract and elsewhere.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the method of fabricating the device as disclosed by Mashiko to the display device of Kishimoto and Murouchi to inject the liquid crystal material into the cell in a short time without deforming or damaging the cell while eliminating an occurrence of unwanted deficient injection of the liquid crystal, bubbles and cavitation (Col.3, lines 43-47 of Mashiko).

8. Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kishimoto as applied to claim 2 above, in view of Ishikawa et al. (Ishikawa) (U.S.Patent No. 6,414,733).

Kishimoto discloses common electrode (34), Kishimoto does not explicitly disclose switching elements and the connection of these switching elements to the pixel electrodes. Ishikawa on the other hand, in disclosing a liquid crystal display device not only discloses column spacers, switching elements TFT (23), pixel electrodes but also discloses the use of common electrode (22) on one of the substrates. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the switching elements, common electrode as disclosed ed by Ishikawa to the LCD disclosed by Kishimoto to enhance the display efficiency and contrast ratio.

9. Claims 7-9 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kishimoto and Ishikawa as applied to claims 6 and Kishimoto and Murouchi as applied to claim 12 above, and further in view of Ogura et al. (Ogura) (U.S.Patent No. 5,739,888).

Kishimoto and Ishikawa disclose column spacers but not spherical spacers or reinforcement spacers in the sealing layer or the specific relationship between the diameter of the spacer to the thicknesses of the various films.

Ogura discloses a sealing layer (28) spacers (30) and the relationship of the diameter of the spacer to the thicknesses of various films (Col. 6, line 50-65

and col. 9, lines 35-54). Ogura also discloses that the particle diameter of the spacers (11)

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the specified thickness relationship as disclosed by Ogura to the display device as recited in instant claims so as to provide a display element which is free from irregularities in luminance in its effective display area and has uniform display quality (Col. 3, lines 32-34 of Ogura).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prasad R Akkapeddi whose telephone number is 703-305-4767. The examiner can normally be reached on 7:00AM to 5:30PM M-Th.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H Kim can be reached on 703-305-3492. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0530.

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TOANTON  
PRIMARY EXAMINER